derivatives (each an inquiry of unparalleled magnitude and importance), he made biology, on the chemical side, a science.

Fischer appears to have continued to exercise his academic activity throughout the period of hostilities, as communications bearing his name have been published at frequent intervals. It is difficult to imagine that he can have taken any part in the hellish work of war. The loss of such a man at such a time is greatly to be deplored, as he would probably have been one of the few to exercise an ameliorating influence. He died at the comparatively early age of sixty-seven.

Fischer received the Davy medal from the Royal Society in 1890 and was elected a Foreign Member of the society in 1899. He was awarded the Nobel prize in 1902. He had many competent English and American workers among his students, who rendered him no slight assistance. His laboratory has been one of the limited number in which, of late years, experience of real value, both technical and moral, could be gained; few men have set so high an example to their students and no one was more mindful in spirit of his countryman Kekulé's saying, "Nur keine unreifen Früchte." He would recommend no one who was not sufficiently trained. Many are now seeking entry into practice here who are not only under-trained but also unaware of their ignorance: herein lies our danger—we have yet to attach real meaning to the term "chemist" and to follow Fischer's example. As representative of the genus in its most highly developed modern form, he is to be placed at the very apex.

From the time of Liebig onward English students have visited German laboratories and these have undoubtedly afforded them valuable opportunities. But the Germans have also been gainers thereby and they have yet to realise what they lose by our withdrawal. The change of circumstances will be to our advantage in many ways. The object of higher training should be to promote originality and individuality, but instead of being trained on individualistic lines, of late years students in Germany have been led to worship authority rather than to be freethinkers.

A more serious consequence of the constant emigration of our students to German laboratories, however, was the effect this had in preventing the development of higher education in our own schools: until recently it rendered the systematic prosecution of chemical inquiry and the formation of schools of research in this country almost impossible. Our most capable workers were constantly withdrawn from us just as they were about to become valuable instruments—we were allowed to sharpen pencils but not to use them. In fact, we have allowed the Germans to monopolise not only the dyestuff industry but also the higher academic industry—and not only have our best students been encouraged to leave us but we have also done our utmost to sterilise the intellects of the remainder by a cast-iron system of examinations. The 1851 Commissioners, unfortunately, favoured this policy; indeed, at one time they almost forced their chemical scholars to go to Germany. As there was no interchange, we were left without helpers. The protests made as to the impolicy of the course were of no avail—we were told, in no halting terms, that we sought to keep students at home to serve as our assistants; yet the Germans were allowed to use them to their ends—in the eyes of our officials what was improper here was permissible abroad. Fortunately, during the past decade or two, we have been successful in gradually stemming the tide of emigration and our higher instruction has been developed apace, though hitherto it has never been otherwise than starved.

H. E. A.

## NOTES.

THE Forestry Bill, which was brought up in the House of Lords early in the month, has now passed its third reading. The Bill is the first attempt at forestry legislation to be brought before Parliament since the question of afforesting some of the waste lands in the country was first mooted more than thirty years ago. During this period numerous Commissions and Parliamentary Committees were appointed to consider this matter, but no planting was undertaken as a result of their deliberations. It is the war, and the enormous demands for timber, especially the soft woods of the trade, entailed by it, which opened the eyes of the Government to the dangerous position in which Great Britain stood in the matter of timber supplies. The Government Bill now before the country is closely based on the recommendations made by the Forestry Sub-Committee appointed by the late Minister of Reconstruction. It proposes the appointment of a Forestry Authority of seven (reduced to five in the House of Lords) Commissioners and the afforestation of 1,750,000 acres in eighty years, a quarter of a million acres to be planted in the first ten years at a cost of 3,500,000*l*. The total cost of the undertaking will certainly be far greater than the estimates laid before the House, these estimates being very nearly pre-war figures. The Bill was introduced by the Earl of Crawford. It was opposed by Viscount Haldane, whose chief arguments were the danger of erecting an authority of the kind proposed, which would not be subordinate to any Minister; and possessed of funds drawn from the Consolidated Fund, and not, therefore, placed on the Estimates, and consequently far less open to effective criticism in Parliament. The main point brought out by Lord Haldane, the one really weak part of the Bill from the scientific point of view, is the inadequate manner in which provision is made for future educational and research work and for the representation on the Board of Commissioners of forestry experts possessed of a sound scientific training. In the matter of scientific training and knowledge the proposed Board of Commissioners is a purely amateur one. Unless means can be devised to set up a Board truly representative of what is required—a Board which shall include a strong representation of men provided with a sound scientific training and a wide practical knowledge of forestry conditions throughout the Empire—there is a grave danger that the objects the Bill seeks to achieve will be doomed to failure from the outset, with the resultant disappointment and waste of public funds.

WE regret to learn of the death, at seventy-five years of age, of Antoine Paul Nicolas Franchimont, emeritus professor of organic chemistry in the University of

Leyden. After graduating there in 1871 he worked with Kekulé at Bonn and with Wurtz at Paris, and was appointed in 1874 professor of organic chemistry in his native town. During forty years he trained many Dutch organic chemists, and on his retirement in 1914 chairs in the other three Dutch universities were in the occupation of his pupils. Besides being an enthusiastic teacher, Franchimont was an indefatigable investigator. His principal work was concerned with the nitro-amides, which he discovered in 1883, and the aliphatic nitramines ($R.NH.NO_2$). For the preparation of these compounds, often highly explosive, he introduced the use of pure ("real") nitric acid, prepared by distilling a mixture of nitric and sulphuric acids *in vacuo*. The use of sulphuric acid and of zinc chloride as catalysts in acetylation is also due to him. Although some of his results (acetyl-cellulose, pure nitric acid) found technical application, he derived no material gain from them. Of an unworldly and retiring disposition, Franchimont did not often frequent scientific congresses, but those who met him at the Cambridge meeting of the British Association in 1904, or visited him at Leyden, will cherish the memory of a kindly man who lived for his science and for his pupils. His family associations gave Franchimont a command of the French language, and he was one of the founders, in 1883, of the *Recueil des Travaux chimiques des Pays-Bas*, in which journal nearly all his subsequent work was published. Outside his native country his merits were recognised by his election to the honorary membership of the Chemical Society and by his appointment to the Legion of Honour.

ON Wednesday, July 23, Mr. F. H. Carr, at a meeting of the British Pharmaceutical Conference, delivered a memorial lecture on the late Lt.-Col. E. F. Harrison, whose invaluable work on the development of the anti-gas respirator has lately been the subject of so much eulogy. No more fitting place could have been chosen for the lecture than the buildings of the Pharmaceutical Society in which Harrison received his training in the profession he had selected, and with which he was afterwards so intimately associated, nor could the delivery of a lecture in his memory have been entrusted to a better or more capable man than Mr. Carr. Most of the audience had been personal friends of Harrison's, some of them for upwards of twenty years, and they knew that the testimony that Mr. Carr bore to his sterling qualities, his upright nature, his sincerity, and the fearless manner in which he grappled with difficult problems, was only too well deserved. The details which Mr. Carr gave of Harrison's early life, his tenacity of purpose and remarkable self-denial, were interesting in the extreme, and went far to explain a certain austerity in his nature. The part which Harrison played in the final phase of his life, the development of the box-respirator, by which so many lives were saved and which contributed so largely to the victorious issue of the war, occupied the latter part of the lecture, which will long remain in the memory of those who were fortunate enough to hear it.

AT the meeting of the British Association in 1914 a wish was expressed for some organisation by which the breeders of plants and animals and those engaged in genetical research might be brought into closer contact with one another. The advent of war prevented the immediate realisation of these hopes, but in the present year, largely through the energy of Miss E. R. Saunders, the Genetical Society has come into being under the presidency of the Right Hon. A. J. Balfour. It is expected that the society will be mainly peripatetic, holding meetings on convenient dates at places where breeding work of interest is in progress, whether at scientific institutions or plant nurseries or stock-raising centres. Open-air demonstrations offer considerable difficulties in the case of large parties, and for this reason it was held advisable to limit the number of members of the society to 120, and to impose certain qualifications for membership. Candidates for admission must either be, or have been, engaged in genetical research, in the teaching of genetics, or in the practical breeding of plants or animals. It is proposed also to hold meetings from time to time for the reading of papers and the discussion of results. It was appropriate that the society should enter upon its active existence with a visit to Cambridge, the cradle of modern genetic studies. Between thirty and forty members attended the meeting on July 12, at which Miss Saunders gave a lucid and interesting account of the present state of knowledge of the genetics of stocks. The members present visited the garden where these experiments have been in continuous progress since the end of last century. Prof. Punnett gave an account of some experiments with sweet peas designed to test the validity of the chromosome hypothesis of heredity, and Prof. Biffen demonstrated wheat material in connection with the inheritance of immunity and susceptibility to rust. Mr. J. B. S. Haldane also described some experiments with two new colour varieties of rats which have recently come into existence, illustrating his account with living examples. The secretaries of the society are Miss C. Pellew, The John Innes Horticultural Institution, Merton, S.W.19, and Prof. Punnett, Whittingehame Lodge, Cambridge, from either of whom further information may be obtained.

WE regret to see the announcement of the death at Naini Tal, in his sixty-first year, of Prof. A. W. Ward, professor of physics at the Canning College, Lucknow. From a short obituary notice in the *Times* we learn that Prof. Ward was educated at Liverpool College and Institute, and at St. John's College, Cambridge, where he held a scholarship, graduating in 1882. After lecturing at the Borough Road Training College and working in the Cavendish Laboratory, he went out to Southern India in 1885 as lecturer on physical science at the Kumbakonam College, but was soon invalided home. He returned to India in 1889 to take up his Lucknow appointment. He was a prominent figure in all matters connected with the University of Allahabad as a member both of the Senate and of the Syndicate, and was its representative on the United Provinces Legislature. Prof. Ward contributed a number of scientific papers to the Proceedings of the Royal Society and to the *Philosophical Magazine*.

IN the *South African Journal of Science* for 1918 (vol. xv., No. 6) the Rev. J. R. L. Kingon discusses "Cattle as a Factor in the Economic Development of South Africa." He considers the cattle question in relation to the Portuguese voyagers; the aborigines, including Bushmen, Hottentots, and Bantus; the Dutch; and the first British occupation, and shows that much of the history of the country is focused in its cattle. He leaves untold the story from the time of the second British occupation down to the present day, during which period the question has been of no less importance.

SELDOM has a more elaborate monograph descriptive of a group of people numbering fifty-seven souls been prepared than that issued as vol. xlii., part i., of the Journal of the College of Science, Imperial University of Tokyo (R. Torii, "Etudes Archéologiques et Ethnologiques: Les Ainou des Iles Kouriles"). The author remarks that in all the many accounts of the Ainu, those of the Kurile Islands have been strangely neglected, but that they form an important factor in the study of this remarkable people. This claim is fully justified by the appearance of this elaborate account of them, dealing with their history, linguistics, sociology, customs, and superstitions. It is illustrated by thirty-eight pages of photographs and by numerous drawings in the text.

In Norway, as elsewhere, the little Scrophulariaceous plant Euphrasia, best known to us as the common eyebright, is extraordinarily variable. The numerous forms that have been described, notably by R. v. Wettstein, may be due in part to local influences, differences of moisture, and the like, and appear to revert to the norm when withdrawn from the action of such influences. Other forms seem to be more permanent, and may be definite mutations provoked by differences of climate in different districts or changes of climate in past time, or by other physical changes in the environment. Such forms may be regarded as true species or sub-species. Yet other forms are probably hybrids between those last mentioned, and, though of apparently constant recurrence, would be susceptible to Mendelian analysis. Before such analysis is undertaken it is certainly helpful to have a very exact systematic survey of all the variations that occur in a state of nature; and this is the task that has been accomplished for the Norwegian species by Mr. E. Jørgensen, whose results have just been published in Bergens Museums Aarbok, 1916–17 (Naturvidenskabelig Raekke, 2 Hefte, 337 pp., 11 maps, 14 pls., 1919). The main text, which is in German, is also illustrated by enlarged diagrams of detail, and there is an English summary. The author recognises five species, with sub-species, forms, and sub-forms, all belonging to the sub-genus Eueuphrasia, Wettst., section Semicalcaratæ.

Light has been thrown upon a very fascinating theme by the publication of Dr. Gilchrist's paper on "Luminosity and its Origin in a South African Earthworm" (Trans. Roy. Soc. S. Africa, vol. vii., part 3, 1919, pp. 203–12, pl. xxiv.). We have but one regret: the species of Chilota which displayed the phenomenon in so marked a degree is not identified. So long ago as 1900 no fewer than thirty species had been described. Chilota is nearly related to Photodrilus, Giard, and one species of this genus is now known as *Microscolex phosphoreus* on account of its luminous properties. Until each species known to be luminous has been definitely determined, we shall always have confusion. But in regard both to the information given and to the inferences or conclusions drawn therefrom, Dr. Gilchrist's paper is a decided advance on its predecessors. Fungi, bacteria, gregarines, and other lowly organisms have been regarded as agents in the production of luminosity, and the author not only states the case as it formerly stood, but also gives a very clear and instructive view of his own observations and findings. The fluid exuded was subjected to a variety of tests, and found to consist mostly of single cells heavily laden with inclusions of different kinds. "The luminosity is given out by the inclusions of small size, and these seem to be of a substance allied to fat, by the oxidation of which light is produced."

The Weekly Bulletin of the Hawaiian Volcano Observatory records in vol. vii., No. 1, for January, 1919, the very considerable appearance of "smoke" that may arise from incandescent lava owing to copious evolution of sulphurous gases. The bulletin continues to give admirable photographs of successive stages of activity in Kilauea.

Mr. Thomas Sheppard, well known for his researches and historic studies in British stratigraphy, has given an interesting account of "Martin Simpson and his Geological Memoirs" in the Proceedings of the Yorkshire Geological Society (vol. ix., p. 298). Simpson was well known to visitors in the classic surroundings of Whitby, and published a summary of the contents of the Whitby Museum at the age of ninety-one, a year before his death in 1892.

In *Naturen* for April–May, 1919 (forty-fourth year, Nos. 4–5), Hr. Olaf Holtedahl gives a distinctly original series of maps showing the relations of land and sea "i jordens oldtid" in the North Atlantic region. The "oldtid" dealt with ranges from Ordovician to Permian times, and the maps, and the evidence discussed, include the whole North Polar area and that down to Newfoundland and the British Isles. The maps, if enlarged, would make an excellent series of lecture-diagrams.

The literature of that old and recurrent subject, the origin of flint, is added to by Mr. W. H. Twenhofel in a paper on chert in Kansas and Oklahoma (*Amer. Journ. Sci.*, vol. xlvii., p. 407, 1919). The author refers to W. A. Tarr's work (see Nature, vol. ci., p. 174), but does not seem to have considered the formation of flint-zones by deposition of silica in waters moving at right angles to the stratification. He assigns, at any rate for the region dealt with, an early date in the history of the unconsolidated rock for the growth of flint from silica in solution in the sea.

In a paper recently received (Académie d'Agriculture de France, October 23, 1918) Prof. J. Mascart, the director of Lyons Observatory, has directed attention to the exceptional nature of the two winters 1916–17 and 1917–18 in that neighbourhood. Both produced cold spells of unusual severity, and the sequence of two such winters following one another appears to be almost unique. In the winter of 1916–17 the autumn might be said to be prolonged to January 15, after which, with two brief exceptions, temperature remained low until April 28, falling at times below $-20^\circ$ C. over extended regions. Thereafter the first fifteen days of May were very warm, so that the season of spring was entirely suppressed. The features of the following winter were very different; there was a cold spell from mid-October to mid-January, after which the weather became mild until the end of March, the break in January being of a very pronounced character. Thus the lowest temperature of the winter occurred on January 5, $-17{\cdot}1^\circ$ C., and the mean temperature of that day was $-11{\cdot}2^\circ$ C. On January 20 the mean was no less than $+11{\cdot}7^\circ$ C., or $22{\cdot}9^\circ$ C. above that of January 5. This difference is greater than that between the mean coldest and the mean warmest days of the year. Attention is directed to the fact that the two winters were almost inverse, so that mean temperature from the two combined would have shown little of note. In considering the effect of such winters on fruit-trees and crops the difficulty of eliminating other factors is pointed out, and it is suggested that close collaboration between agriculturists and meteorologists is necessary to arrive at any conclusion of value.

A valuable article on the mechanical extraction of coir is published in the *Philippine Journal of Science* (November, 1918); also one on the mechanical properties of Philippine coir and coir-cordage. The same issue also deals with steaming tests of Philippine coals.

THE annual report of the Board of Scientific Advice for India, just to hand, gives a very comprehensive summary of the work carried out by the different departments for the year 1917–18. The section reports deal with applied chemistry, astronomy, meteorology, terrestrial magnetism, geology, geodesy, botany, agricultural bacteriology, forestry, zoology, veterinary science, and medical research.

THE first number of *Science and Industry*, the official organ of the Commonwealth Institute of Science and Industry, is just to hand. The aim of the new journal is to serve as an authoritative medium for the expression of Australian scientific thought and aspirations. Contributions are welcomed at the same time from all independent scientific workers. The object of the new institute is the co-ordination of scientific research in the Commonwealth. At present there is a paucity of trained scientific workers and much overlapping. The inaugural number contains articles and notes of primary interest to Australian industries, *e.g.* the prickly pear pest, the obligation of science to pastoral industry, applications of veterinary research, the artesian water problem, sheep-fly investigations, etc.

THE Journal of the Royal Society of Arts for July 4 contains a paper on science and industry in Australia, which was read by Sir John McCall, whose death on June 27 is so deeply lamented. The paper sketches the development of agriculture in the Commonwealth, and sets forth the hopes for the future, especially in view of what is being done to promote scientific research and study. Australia contains vast mineral resources, particularly coal and iron, and the manufacture of iron and steel should be greatly facilitated by the excellent metallurgical coke derived from the coal of New South Wales and Queensland. Now that the steel industry is established in the continent, it is expected that wire and tinplate manufactures will be greatly stimulated. In regard to more scientific manufactures also, progress has been made during the war, and, with further development, they should be capable of production at much lower prices than those at which they can be obtained from Germany.

DR. R. E. SLADE, director of research of the British Photographic Research Association, has presented a report upon work in progress or contemplated. A wide programme of research has been drawn up and preliminary experiments have been made on a large number of subjects. The history of photographic science and industrial development shows that, since the publication in 1891 of the researches of Hurter and Driffield, practically no new methods of attacking the problems of photography have been introduced. Many workers have improved and worked out further details of the old-established methods, and very considerable advances have been made, but the time now seems ripe for entirely new methods of photographic research. The association is using all the means at its disposal to initiate such new methods, and is making progress in this direction. Some experiments have been made on gelatin, which, though not suitable for publication, will be of great use in future work. Progress has been made in investigations of photographic emulsions, and a communication on this subject will be circulated shortly. Success has been attained in staining wood black or grey right through. This black wood, which was made in Germany before the war, is used by manufacturers of cameras and optical instruments, and the grey wood for picture-frames and furniture. The process, for which an application for a patent has been filed, should be suitable for use on a large scale, and also be economical. Results of research, whether theoretical or experimental, which are of general interest, and not of immediate use for application to specific problems of the industry, are published at the first opportunity to increase knowledge in photographic science generally, and to induce other workers to devote their attention to theoretical photographic problems. The offices of the association are at Sicilian House, Southampton Row, London, W.C.1, and the secretary is Mr. A. C. Brookes.

A NEW volume by Mr. E. H. Chapman will shortly be added to the Cambridge Nature Study Series, published by the Cambridge University Press. The title is "The Study of the Weather," and the aim of the book is to provide not only a series of practical exercises on weather study, but also a simple introduction to the study of modern meteorology.

MR. CHARLES BAKER'S current list of second-hand scientific instruments is now available for distribution. The catalogue gives particulars of more than 1500 pieces of apparatus which can be examined at 244 High Holborn, London, W.C.1. Mr. Baker holds a large stock of materials for colour photography, and can undertake the immediate delivery of standard material. Every instrument included in the list is guaranteed, and customers can, in certain circumstances, have pieces of apparatus for three days on approval before actually purchasing.

## OUR ASTRONOMICAL COLUMN.

A WORLD SURVEY.—The Paris Bureau des Longitudes is proposing to make use of wireless telegraphy to determine the geodetic position of certain points on the earth's surface which shall be considered fundamental, and may be used as reference points for future geodesy. Triangulations have been made and arcs of longitude measured in different regions of the world which have been co-ordinated, but it is possible that the attachment of these may be improved. The closing error in the longitude of the sphere, or the amount by which the sum of the arcs circumscribing the earth differs from 24 hours, is about a fifth of a second of time. The details of the plan at present suggested are that Paris, Shanghai, and a third point in the neighbourhood of San Francisco shall be taken as primary points. The latitude of each is to be determined, possibly with the prism astrolabe, and the difference of longitude between each consecutive pair measured. It is suggested that the clocks at Paris and Shanghai may be compared by means of signals from the radio-telegraphic station at Lyons, those at Shanghai and San Francisco by signals from Honolulu, whilst signals from Annapolis would serve for the comparison of the clocks at San Francisco and Paris. This is the main feature of the scheme, to which subsidiary details will be added. It is proposed, for instance, that the position of a point in New Zealand, the antipodes of France, shall be determined, and naturally it is hoped that Greenwich will take part in the operations and form one of the points of reference.

SOLAR PHYSICS AT CAMBRIDGE.—The sixth annual report of Prof. Newall, the director of the Solar Physics Observatory at Cambridge, which relates to the year ending March 31 last, shows that the staff is returning after war service, and that one member only is absent, Capt. W. E. Rolston, who is with the Army in Cologne. The staple work of the institution is divided under three heads:—(A) Stellar work, which at present consists mainly of the classification of stellar spectra, and the arrangement of these in sequence in relation to the intensities of characteristic lines. (B) Solar work, the observational